



# BENZIDINE

CAS # 92-87-5

Agency for Toxic Substances and Disease Registry ToxFAQs

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This fact sheet answers the most frequently asked health questions (FAQs) about benzidine. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**SUMMARY:** Benzidine was used in the past in dyes. Current low-level exposure may occur near waste sites that contain it. Exposure to high levels of benzidine may cause cancer of the urinary bladder and other types of cancer. Benzidine has been found in at least 27 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

## What is benzidine?

(Pronounced bĕn'zĭ-dĕn')

Benzidine is a crystalline (sandy or sugar-like) solid that may be grayish-yellow, white, or reddish-gray in color. It does not occur naturally. Its smell and taste have not been described.

In the past, industries used large amounts of benzidine to produce dyes for cloth, paper, and leather. However, it has not been manufactured for sale in the United States since the mid-1970s.

Benzidine is no longer used in medical laboratories or in the rubber and plastics industries. Some benzidine-based dyes (or products dyed with them) may still be imported.

## What happens to benzidine when it enters the environment?

- ☐ Benzidine has been found in waste sites and landfills.
- ☐ Benzidine sinks and becomes part of the bottom sediment in water.
- ☐ It exists in the air as very small particles, which may be brought back to the earth's surface by rain or gravity.

- ☐ Benzidine can slowly be broken down by certain other chemicals and light.
- ☐ Benzidine can also be broken down by some micro-organisms.
- ☐ Only a small amount of it builds up in fish, shellfish, plants, and animals living in water containing it.

## How might I be exposed to benzidine?

- ☐ Drinking contaminated water or breathing air near waste sites and landfills that contain benzidine.
- ☐ Contact with soil from a waste site that contains benzidine.
- ☐ Exposure rarely occurs in places other than waste sites.
- ☐ It has not been found in food.

## How can benzidine affect my health?

Little information is available about the health effects that may be caused by benzidine. It is not known what happens if you breathe or ingest the chemical, and whether it could cause birth defects or other problems. It is known that benzidine contact with your skin could possibly cause a skin allergy.

ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>

### How likely is benzidine to cause cancer?

The Department of Health and Human Services (DHHS) has determined that benzidine is a known carcinogen.

It is known that benzidine causes cancer in people. Studies have shown cancer in workers who were exposed to high levels of benzidine for many years. Cancer of the urinary bladder was most frequent, although cancers of the stomach, kidney, brain, mouth, esophagus, liver, gallbladder, bile duct, and pancreas also occurred.

Experiments with animals have also shown benzidine to be a carcinogen. Leukemia and cancers of the liver, uterus, mammary gland, lung, bladder, and colon have been observed in animals exposed to high levels of benzidine.

### Is there a medical test to show whether I've been exposed to benzidine?

Laboratory tests can detect benzidine or its breakdown products in urine. Measurement of benzidine and its breakdown products in urine must be completed within 2 weeks after your last exposure.

Benzidine can also be detected in the blood. Benzidine and some of its breakdown products will bind to your red blood cells, and this can be detected for up to 4 months after your last exposure.

These tests are not usually available in most doctors' offices because special equipment is needed to complete them. These tests cannot tell how much benzidine you have been exposed to or whether you will experience any health effects.

### Has the federal government made recommendations to protect human health?

The EPA has set water quality guidelines to protect people's health. These guidelines suggest benzidine concentration limits that are less than 0.001 part benzidine in a billion parts of water (ppb).

The EPA requires that spills or accidental releases of benzidine into the environment of 1 pound or more must be reported. The EPA lists benzidine as a hazardous air pollutant (HAP).

The Occupational Safety and Health Administration (OSHA) has regulations including entry controls, housekeeping and disposal rules, and other regulations on operating and handling procedures to keep benzidine exposure to a minimum.

The National Institute for Occupational Safety and Health (NIOSH) recommends that worker exposure to benzidine-based dyes be kept to the lowest feasible concentrations.

### Glossary

**Allergy:** Abnormal reaction to a substance in amounts that do not affect most people.

**Carcinogen:** A substance that can cause cancer.

**CAS:** Chemical Abstracts Service.

**Sediment:** Mud and debris that have settled to the bottom of a body of water.

### References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for benzidine (update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

### Where can I get more information?

For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

